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WHY DO COMPANIES ISSUE CONVERTIBLE BOND LOANS? AN EMPIRICAL ANALYSIS FOR THE CANADIAN MARKET

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Abstract

We examine the wealth effects associated with the announcements of convertible debt offerings in the Canadian market for the period between 1991 and 2004. The average wealth effect for the three day event window is a significantly negative -2.7%. This result is in line with previous studies on other Anglo-Saxon markets, but it is different from other markets where generally no effect or even a positive effect is found. In addition, support is found for the negative effect of both debt- and equity-related agency costs.

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Why do companies issue convertible bond loans? An empirical analysis for the Canadian market

1. INTRODUCTION

A question that receives considerable attention in the theoretical as well as empirical corporate finance literature is why companies issue convertible debt. While practitioners put forward notions such as delayed equity, lower coupon rate and "sweetening" of deals that are otherwise hard to sell[1], academics have proposed theories that relate the use of convertible debt to informational asymmetries (Brennan and Kraus, 1987, Brennan and Schwartz, 1988, Kim, 1990, and Stein, 1992), agency issues (Green, 1984, Mayers, 1998, and Isagawa, 2000) and tax motives (Jalan and Barone-Adesi, 1995). These theories in general suggest that companies that face high debt- and/or equity-related agency costs could benefit from issuing convertible debt as opposed to other "straight" means of financing. Prime candidates for issuing convertible debt are companies for which straight debt or equity do not provide the most efficient way of financing. These include companies to which one of the following problems applies: difficulty in estimating risk, possession of ample growth opportunities, high costs of financial distress, financial constrains, and/or high agency costs.

A convertible bond, from now on to be referred to as a convertible, is a bond that can be exchanged for a predetermined fixed number of "new" shares of the issuing company within a predetermined period of time. In essence, a convertible is a package consisting of a straight bond and warrants written on the issuing company stock.[2] Empirically it is well documented that different security types induce different wealth effects at the time of their announcements. For example, seasoned equity offerings induce the strongest negative wealth effects (see, e.g., Masulis and Korwar, 1986, Mikkelson and Partch, 1986, and Asquith and Mullins, 1986) of between -2.5 and -4.5 percent, while straight debt issues induce only slightly (many times insignificant) negative wealth effects (see, e.g., Dann and Mikkelson, 1984, and Eckbo, 1986). Given the hybrid character of convertibles, we can expect that the size of the wealth effects associated with the

[1] See, for example, surveys of managers by:
- Billingsley and Smith (1996) (for the U.S. market)
- Graham and Harvey (2001) (for the U.S. market)
- Bancel and Mittoo (2004) (for the European markets).

[2] Given that the exercise price is "paid" by redeeming the bonds, convertible bonds are in fact warrants with a variable exercise price.

announcements of convertible security offerings will be between those for straight debt and equity.

Previous studies on stock market reactions to the announcements of convertible debt issues in the U.S. market document significant negative effects of convertible debt announcements in the range between -1 to -3 percent.[3] Other studies on Anglo-Saxon markets find similar results, that is, Magennis, Watts and Wright (1998) and Abhyankar and Dunning (1999) find significantly negative effects for the Australian and the UK markets respectively. Outside the Anglo-Saxon markets, the empirical evidence has been somewhat less conclusive. Burlacu (2000), Dutordoir and Van de Gucht (2005a), Ammann, Fehr and Seiz (2006) find similar effects for France, Western European markets, and Germany and Switzerland respectively. However, results for other markets go in the opposite direction. More specifically, Kang and Stulz (1996), and Christensen, Faria, Kwok, and Bremer (1996) find positive effects for the Japanese market; Chang, Chen, and Liu (2004) find positive (insignificant) effects for the Taiwanese market; and De Roon and Veld (1998) find a significantly positive effect for the Dutch market. The hybrid nature of convertibles and the institutional and regulatory differences among countries and markets seem to be the driving force of the divergence. This makes the analysis one of the more interesting fields in empirical corporate finance today, since convertible debt can be structured to be either more debt- or equity-like as to mitigate some of the risks and deficiencies associated with each of "plain" securities.

Following Burlacu (2000), Lewis *et al.* (2003) and Dutordoir and Van de Gucht (2005a), we estimate the structure of the convertible debt design (i.e. how debt- or equity-like it is) by employing the delta measure. The delta measure relates the price sensitivity of a convertible to the underlying equity, and takes values between 0 and 1. A value closer to 1 suggests that the convertible is more equity-like, since the probability of conversion is higher. As an alternative measure of the convertible debt design we use equity-to-debt component ratio, where equity and debt components are estimated using the valuation approach proposed by Tsiveriotis and Fernandes (1998). Note that issuers of convertibles that are more equity-like are supposed to be more adversely affected by equity-related costs, while debt-like issuers are more negatively affected by debt-related costs.

[3] These studies include Dann and Mikkelson (1984), Mikkelson and Partch (1986), Lewis, Rogalski and Seward (1999, 2003), and Arshanapalli, Fabozzi, Switzer, and Gosselin (2004). See Table 12.4 of Loncarski, ter Horst and Veld (2006) for a complete overview of studies on wealth effects associated with convertible debt issue announcements.

According to adverse selection models on capital structure (e.g. Myers and Majluf, 1984), we expect that more debt-like offerings are associated with less negative abnormal returns and more equity-like offerings with more negative abnormal returns. Moreover, we do not expect more debt-like convertible offerings to be significantly affected by equity-related agency costs and more equity-like convertible offerings by debt-related agency costs.

The purpose of this paper is twofold. The first objective is to provide further evidence on the market reactions to convertible debt offerings. The second objective is to examine the nature and determinants of the size of the wealth effect with respect to issuer characteristics and relate the findings to theories about motives for the use of convertible debt. We examine the influence of several issuer characteristics on announcement reactions in the Canadian market in the period between 1991 and 2004. This study is related to previous, mainly U.S. based research, since the Canadian market shares many of its design features with its U.S. counterpart and adds to the literature on the use of convertible debt. To our knowledge this is the first study that examines the wealth effects associated with convertible debt issues in the Canadian market.

Our empirical findings are mostly in line with the seminal work of Myers and Majluf (1984) on external financing and the role of informational asymmetry. As in the U.S., the event study analysis shows that wealth effects associated with the announcements of Canadian convertibles offerings yield significantly negative abnormal returns of around -2.7%. The analysis shows that this is to be attributed to the more equity-like nature of most of the convertibles issued in the Canadian market in the period under consideration, in particular before 2000.

With respect to the firm-specific determinants of announcement price reactions, we find that the abnormal returns are driven by factors related to both the debt- and equity-like features of convertible debt: interest coverage, which affects debt-related costs, and stock price run-up (overvaluation issue), which drives equity-related costs. Firms that pay dividends are consistently found to have higher cumulative average abnormal returns related to the announcement of the convertible offerings, as the dividend payout serves as a disciplining device that lowers equity-related agency costs. These results appear to be robust across different specifications, i.e. when we control for the stated use of the proceeds (acquisitions, capital expenditures or refinancing). These findings are in line

with the theories that relate the use of convertible debt to mitigate different aspects of informational asymmetries. We do not find support for tax arguments for the use of convertible debt. With respect to the control variables, our results indicate that firm size in some cases negatively affects the abnormal market response at the time of a convertible debt announcement. This is somewhat surprising to the extent that both debt- and equity-related costs are expected to be reduced for larger firms, but could also be viewed from the perspective that opaqueness increases with the size of a firm.

The remainder of this paper is structured as follows. The next section reviews the theoretical models yielding the testable hypotheses for our study. Section 3 describes the sample, provides some summary statistics, and discusses the methodology. In Section 4 we present the empirical results on the announcement returns and their determinants. Section 5 gives the conclusion.

2. SHAREHOLDER REACTIONS TO CONVERTIBLE DEBT ANNOUNCEMENTS

2.1. Wealth effects associated with the announcements of convertible debt offerings

A general explanation of why investors react negatively to security offerings follows from the informational asymmetry between managers and the market with respect to value of assets in place and/or future growth opportunities. In this respect, security offerings are viewed as special examples of the lemons problem presented by Akerlof (1970). The models of Myers and Majluf (1984) and Miller and Rock (1985) can be viewed as specific applications of the lemons problem. According to these models, when a company issues risky securities, investors will demand a discount on the security price in order to be compensated for a potential overvaluation of the firm. Therefore, the announcements of convertible issues are predicted to have a negative impact on the issuer's stock price.

From the results of previous studies it appears that the abnormal returns may be driven by the type of the financial system. Market-oriented systems, including those in the U.S., Canada and the U.K. have well-developed financial markets and open corporations with widely dispersed share ownership. On the other hand, network-oriented systems, including those in Japan, Germany, Switzerland and the Netherlands have strong banks with large share ownership and a greater role in monitoring. In the market-based

systems it is expected that managers are more likely to act in the interest of existing shareholders, and informational asymmetries may be larger. It follows from Myers and Majluf's (1984) adverse selection model that in these systems the market reaction to convertible debt issues may be less favourable. In the network-oriented systems, where managers are more likely to be entrenched given their institutional settings, the Myers and Majluf model may not hold.

A second explanation for negative stock returns at the announcement of convertible debt issues attributes these returns at least in part to systematic underpricing of public offerings. If public offerings are underpriced, then wealth is transferred from the firm's current stockholders to the purchasers of the underpriced securities. Evidence of underpricing for convertibles at the issue date is reported by Kang and Lee (1996) and Chan and Chen (2005) for example.

Given the adverse selection model of Myers and Majluf (1984), the possibility of underpricing and the nature of the convertibles (hybrid securities) we test the following hypothesis regarding the wealth effects associated with the announcements of convertible debt offerings.

Hypothesis 1: The announcement of convertible bond offerings by companies in Canada has a significant negative market valuation effect.

2.2. Determinants of the size of wealth effects

In general the following characteristics determine market response to convertible debt offering:

- issue characteristics (see, e.g. Magennis *et al.*, 1998, Burlacu, 2000, and Dutordoir and Van de Gucht, 2005a);
- issuer characteristics (see, e.g. Jen, Choi, and Lee, 1997, Lewis *et al.,* 1999 and 2003, Dutordoir and Van de Gucht, 2005a, and Chang *et al.,* 2004);
- aggregate volume of issues in the market (e.g. Dutordoir and Van de Gucht, 2005b, and Lewis *et al.,* 2003);
- market sentiment and macroeconomic factors (e.g. Lewis *et al.,* 2003).

By adjusting the parameters of the issue (maturity, conversion price, callability, etc.) issuers can structure the convertible to be either more straight debt-like or more equity-like. More debt-like convertibles will have higher conversion prices (and consequently higher conversion premiums) and/or shorter maturities than more equity-like bonds, all else being equal. By classifying convertible issues into more debt- or equity-like as captured by the delta measure (see Section 3.3), we will test the following hypothesis.

Hypothesis 2: The market valuation effect will be more negative for equity-like convertibles than for debt-like convertibles.

The effect of issuer characteristics on the size of the wealth effect associated with the announcements of convertible debt offerings can, in general, be separated according to the dominating nature of the convertible issue (debt- versus equity-likeness) and related to the motives for issuing such security. Convertible debt is a particularly useful financing instrument in cases where informational asymmetries and market imperfections make the use of straight debt or equity more costly or even impossible.

As Brennan and Schwartz (1988) and Brennan and Kraus (1987) show, convertible debt mitigates problems associated with the risk estimation of value and returns of assets already in place. According to these explanations, convertible debt represents an alternative to straight debt, which would be very costly and/or difficult to issue. Green (1984) also considers convertible debt as a resolution to the agency conflict between bondholders and shareholders, where shareholders may be inclined to expropriate debt-holders by substituting less risky investment policies for riskier ones due to their limited liability in a standard debt contract. Since convertible debt can be turned into equity at the discretion of bondholders, it alleviates the risk shifting problem and can therefore be viewed as a substitute for straight debt.

When treated as a substitute for straight debt, the information signalling model of Ross (1977) suggests that the issuance of debt securities conveys favourable information to the market. A manager of a successful firm may choose to increase the leverage to send positive signals to the market about the future performance of the firm[4]; unsuccessful firms cannot mimic these signals because they have insufficient earnings to meet the

[4] Here, it is assumed that manager's compensation policy includes a penalty in cases of bankruptcy, which makes the signal costly for the sender (manager). In reality this is usually the case, as managers lose their position when companies experience financial distress.

debt payments. On the other hand, Myers (1977) demonstrates the opposite – firms with higher share growth opportunities with respect to the current value of the firm issue less debt. In the spirit of Myers, increases in leverage can be interpreted as a worse signal about future growth opportunities of the company.

From the debt perspective, the effect of convertible debt issuance on leverage is not obvious since it has both debt-like and equity-like components, if we analyze the entire sample of convertible issues. However, for more debt-like convertibles, the level of debt-related costs at the firm level should have a negative impact on the price response. Firms are expected to face high debt-related costs when their financial leverage is high and earnings are not sufficiently adequate to service the interest payments, since these factors increase the risk of financial distress and the threat of bankruptcy. With respect to debt-related costs we test the following two hypotheses, where we take leverage and the Times-Interest-Earned (interest coverage) ratio as proxy measures for the level of debt and the risk of financial distress.

Hypothesis 3a: Higher financial leverage negatively affects the market valuation, in particular for more debt-like convertibles.
Hypothesis 3b: Interest coverage positively affects the market valuation.

From the equity component perspective, Kim (1990) and Stein (1992) argue that convertibles are delayed equity and are used to signal the quality of the firm in the framework of informational asymmetry. This is consistent with the adverse selection model of Myers and Majluf (1984), where conventional equity issues are unattractive due to high issue costs and dilution. Kim demonstrates that the conversion ratio serves as a credible signal of a company's future earnings. Stein argues that good quality firms issue debt, while medium quality firms differentiate themselves from bad quality firms by issuing convertibles.

If the nature of a convertible issue is more equity-like, the equity-related adverse selection costs should negatively affect the price reaction to convertible debt offerings. Lucas and McDonald (1990) show why equity issues on average are preceded by positive abnormal returns. However, in line with the pecking order theory of Myers and Majluf (1984), costs associated with issuing equity should be higher for companies with larger stock run-ups, since they are more likely to be overvalued.

Hypothesis 4a: A period of positive abnormal returns preceding the announcement date negatively affects the market valuation.

Another aspect of the issuer's characteristics is related to the equity-like nature of convertibles: the free cash flow. Jensen (1986) points to the adverse effect of free cash flow on the value for shareholders, in particular in low growth firms. He proposes debt to be a better control or bonding device for managers than payout policy, as company's future payouts can be changed, while debt has to be repaid. Nevertheless, it has been documented that reductions in dividends lead to negative wealth effects for shareholders, and managers try to avoid negative changes in payout policy. This is especially the case if their compensation schemes are related to shareholder value creation. Therefore payout policy has a disciplining function for managers to act in shareholders' best interests. We therefore test the following two hypotheses with respect to the agency cost of free cash flow (agency cost of equity).

Hypothesis 4b: Higher free cash flow negatively affects the market valuation.
Hypothesis 4c: Dividends payments positively affect the market valuation.

Jalan and Barone-Adesi (1995) consider convertibles as delayed equity financing, and motivate their use with the different tax treatment of coupon interest and dividend payments in a setting with market frictions and incompleteness. In such a setting, issuing convertibles increases the residual equity value of the firm, since the firm benefits from the tax shield as opposed to up-front equity financing. The cooperative game, and the fact that firms have repeated need for the financial markets, assure that both firms and investors have an incentive to use convertibles and share their benefits. Compared to straight debt, convertibles offer much less trade-off between interest tax shields and cost of financial distress. In the case of straight bonds, higher interest tax shields are only achievable through higher indebtedness, which increases the probability of financial distress. On the other hand, convertibles offer the benefit of interest tax shields. However, they give a smaller probability of financial distress.[5] We expect a positive effect of the tax burden (marginal tax rate) on the size of abnormal returns,

[5] A direct test of this tax motivated argument for the issue of convertible debt is also related to calls of convertibles, which we will not address in this paper.

especially in the case of more equity-like convertibles, implying some evidence on the tax motive argument. We therefore also test the following hypothesis.

Hypothesis 5: Income taxes positively affect the market valuation, in particular for more equity-like convertibles.

From the reasoning so far it follows that price reactions to convertible debt announcements should be negatively influenced by both debt- and equity-related agency costs, since convertible debt encompasses both debt-like and equity-like components. We consider three additional factors that influence both debt- and equity-related costs.

First, both debt-related costs (e.g. risk uncertainty and financial distress costs) and equity-related adverse selection costs should be lower for larger companies. Larger firms tend to be more familiar to the market, lowering its respective issuing costs because less information search and processing costs are required. On the other hand, the size of the company increases the complexity and analysis, so that the larger company might actually be more opaque. Size, therefore, does not necessarily translate into a smaller adverse selection problem. We therefore use the *size of the firm as a control variable*, but do not have any a priori expectation about the direction of the effect. The size of the company captures complex interactions between different issuer characteristics.

Secondly, De Jong and Veld (2001) argue that the problem of perceived overvaluation will be worse for firms with sufficient slack in the form of liquid assets. The reason for this is that slack provides an alternative source for financing of new projects and thus enhances the potential agency problem (overinvestment) between managers and shareholders. This negative impact should be more pronounced for equity-like convertibles. It is not likely to be detected in the overall sample of convertibles, since its role should be less strong for more debt-like convertibles. However, there is also the opposite potential impact of slack. It can be viewed as a build up of internally generated and needed funds for increased capital expenditures, when the external sources of financing are very costly. This is in particular the case for companies with higher risk and larger growth opportunities (more equity-like issuers). We therefore include *slack in our cross-sectional analysis without hypothesizing its overall effect on the valuation*, since it does not only have a negative effect of increased agency cost of equity, but also a positive effect of internal (less expensive) build-up of funds. In addition, slack can also be

viewed as collateral, in which case it should have a positive effect on valuation in case of debt-like convertibles, where it mitigates agency costs of debt.
Thirdly, a firm with good growth opportunities should face reduced debt- and equity-related agency costs. De Jong and Veld (2001) argue that expectations in the market regarding the profitability of the firm's projects reduce the potential for both the asset substitution problems and adverse selection problems described earlier. We therefore expect that the following hypothesis should hold.

Hypothesis 6: Better growth opportunities of the firm positively affect the market valuation.

Finally, we investigate the effect of the stated use of the proceeds. In the offering prospectuses, firms state the purposes for which the proceeds will be used, such as financing acquisitions, refinancing debt, capital and general expenditures.

3. DATA AND METHODOLOGY

3.1. Sample selection

The sample consists of convertibles issued between January 1991 and December 2004 by Canadian companies that were listed on the Toronto Stock Exchange. During that period there were 207 convertible bond issues in total. We excluded issues made by financial companies (SIC division H – Finance, Insurance and Real Estate), and were left with 149 issues by non-financial companies. Data on announcement dates and other features of the convertible bond issues were obtained from the SDC database and checked against press releases in Lexis-Nexis, Canadian newswires, company web sites and the SEDAR[6] database. For 26 issues in our final sample, we have found discrepancies in the announcements dates. In those cases we used the earliest announcement date that we could find. The criteria for an issue to be included in our sample were:

- The announcement date had to be verifiable through a source other than SDC.
- The issuing firm's stock price data had to be available in DataStream.
- The issuing firm's accounting data had to be available in DataStream.

[6] The SEDAR stands for "System for Electronic Document Analysis and Retrieval" and is a service of CSA (Canadian Securities Administration) providing public securities filings. (http://www.sedar.com/)

- The announcement should not confound with other corporate announcements.
- The conversion option relates to the equity of the issuing company (no exchangeable bonds)[7].
- The issues of the same issuer had to be at least 120 trading days apart in order for the estimation and even periods for different issuers not to overlap.

Given the criteria, the initial 149 issues by non-financial companies first shrink to 129 due to stock price data availability, and further down to 107 issues due to accounting data availability. Of those 107 issues, we could not verify the announcement date for 10 of them; 4 were exchangeable bonds or their conversion price relates to other than the underlying equity; 3 were too close together with the previous issues of the same issuer, causing the overlap; and 4 were joined together with the issues (by the same issuer) announced on the same or the previous day. This means that our final sample consists of 86 bond issues offered by 77 different companies. The breakdown of issues over the years is shown in Table 1.

< Insert Table 1 here >

From Table 1 it appears that 60 percent of the issues in our sample were offered after the end of 2000. This is approximately comparable with the issue year breakdown of all the non-financial companies' issues (136 of them) in the period, with somewhat better coverage in the sample towards the end of the sample period due to scarce data availability for the beginning of the 1990s. Offerings seem to exhibit some bunching, with hot periods being 1993-1994 and the end of the 1990s onwards.

3.2. Event study methodology

The announcement effects of the convertible bonds are estimated using an event study methodology as described in e.g. Campbell, Lo, and MacKinlay (1997). For the market portfolio use the Standard & Poor's TSX (Toronto Stock Exchange) value-weighted price index, which is widely considered as the benchmark for Canadian equities. It accounts for more than 200 stocks listed on the TSX or about 70% of the total market

[7] An exchangeable bond may be converted into *existing* shares of the same or an alternative company. It is much like a convertible, except that in a convertible the bond may be converted into *new* shares.

capitalization. Denoting the announcement period, reported by SDC, as day 0, the estimation period ranges from day -120 to day -20.

3.3. Proxies

The variables that are used in the analysis are related to the hypotheses described in Section 2.

Leverage. Leverage (LEV) is measured as the ratio between total debt and total assets. *Times-Interest-Earned.* The Times-Interest-Earned ratio (TIE) is a measure that is often employed in practice, in particular in restrictive covenants that govern typical debt contracts. It is defined as EBIT (Earnings Before Income and Taxes) over interest expense. *Slack.* SLACK is measured as the ratio of cash and equivalents over total assets. *Free cash flow.* Free cash flow (FCFA) is measured as the ratio of free cash flow (net income plus depreciation minus capital expenditures) over total assets. *Dividend payout.* The dividend payout (PAYDUM) is measured using a dummy variable with value 1 if the company paid cash dividends in the previous year and value 0 otherwise. *Tax burden.* The tax burden (TAXDUM) is also measured using a dummy variable. This variable has value 1 if the company paid income taxes in the previous year and value 0 otherwise. *Growth opportunities.* Growth opportunities are measured using Tobin's Q (Q). This ratio is computed as the sum of market value of equity (measured as the average between (-15,-5) days relative to the announcement date), long term and short term debt. This is divided by the book value of total assets to obtain the market-to-book ratio as the proxy for the growth opportunities. *Size of the firm*. We have added a control variable for firm size, i.e. the natural logarithm of firm size (LNTA).

The size of the equity component of convertible debt. The most difficult variable to proxy is the equity component of convertible debt. As previously shown and used in the literature (see, e.g., Burlacu, 2000), different approaches can be used to determine the size of the equity component embedded in a convertible bond design. Following Burlacu, (2000), Lewis *et al.* (2003), and Dutordoir and Van de Gucht (2005a), we estimate the structure of the convertible debt design (i.e. how debt- or equity-like it is) by employing the delta measure. The delta is derived from the option pricing model of Black and Scholes (1973), adjusted for continuous dividend payments in the way suggested by Merton (1973):

$$\Delta = e^{-\delta T} \cdot N\left[\frac{\left(ln\left(\frac{S}{K}\right)+\left(r-\delta+\frac{\sigma^2}{2}\right)\cdot T\right)}{\sigma\cdot\sqrt{T}}\right] \quad (1)$$

Where S is the current price of the underlying stock, K is the conversion price, δ is the continuously compounded dividend yield, r is the continuously compounded yield on a selected "risk-free" bond, σ is the annualized stock return volatility, T is the initial maturity of the bond and N(.) is cumulative normal probability distribution. The delta measure always takes value between 0 and 1. Values closer to 1 indicate a high sensitivity of the convertible bond value to changes in the underlying equity (stock) value, implying a high probability of conversion. As a proxy for the risk-free rate we use the yield of a Canadian government benchmark bond of the closest matching maturity rounded upwards. For the stock price volatility measure we use the annualized volatility of stock returns as estimated over the period (-120,-20) relative to the announcement date of the offering.

In order to differentiate between equity- and debt-like convertibles we use a delta cut-off value of 0.5. We will denote the sub-sample with a delta smaller than 0.5 as more debt-like, while the sub-sample with a delta greater than (or equal) 0.5 will be referred to as the more equity-like sample. For comparison, Burlacu (2000) denotes convertibles with delta values below 0.33 as debt-like and those with delta values above 0.66 as equity-like. Lewis *et al.* (2003) use cut-off values for delta of 0.4 and 0.6 for classifying bonds as either debt or equity-like. Dutordoir and Van de Gucht (2005a) use the median delta value as a split for this classification.

As an alternative measure of the size of the equity component in convertible debt, we use the ratio of equity to straight debt component value of convertible bond (ED). Values of equity and debt components are estimated using the convertible debt valuation approach proposed by Tsiveriotis and Fernandes (1998). We estimate the model price of the convertible bond at the issue, where the price is the sum of equity (value of the conversion right) and straight debt component. We use values of ED greater than 1 as the reference for the more equity-like convertibles, and values of ED lower than 1 as the reference for the more debt-like convertibles.

4. RESULTS AND ANALYSIS

4.1. Wealth effects associated with the announcement dates of convertible debt offerings

In Table 2 we present the Cumulative Abnormal Returns (CAAR) and tests for *Hypotheses 1 and 2* regarding the wealth effects associated with the announcements of the convertible debt offerings.

< Insert Table 2 here >

In Panel A of Table 2 the results for the total sample are presented. CAARs are significantly negative over different event windows for the total sample. In particular, the size of the effect for the event window (-1,1) is a significantly negative 2.7%. These results are in line with the results from previous studies, in particular those for the U.S. market. Panels B and C of Table 2 report the CAAR for the sub-samples with a value of the delta measure above 0.5 and below 0.5 respectively. The first interesting result is the comparison of wealth effects for the sub-samples in the event window (-10, -2), where the CAAR of 2.24% is significantly positive for more equity-like convertibles (delta above 0.5), and significantly negative (-0.77%) for the more debt-like convertibles (delta below 0.5). The difference between the two values is also significant. This implies that prior to the announcement of the issue, more equity-like issuers experience a significant stock price run-up. This suggests that issuers try to time their announcements after periods of favorable stock price movements. It also suggests that the market is more likely to perceive the more equity-like issuers as overvalued at the announcement dates of the convertible debt offerings in our sample, given the prior streak of positive abnormal returns. Therefore they react more negatively to the announcement. The most negative CAAR for the more equity-like issuers are in the event window (0,20) with significantly negative 6.32%, while more debt-like issuers do not experience significant wealth effects during that period. Based on the results in Table 2 we conclude the following with respect to the hypotheses.[8] Firstly, the market responds negatively to the

[8] The findings in Table 2 are confirmed using non-parametric test results. The Wilcoxon signed rank test, which tests the difference in sums of ranks of the mean adjusted CAAR above and below medium, gives significant differences. These differences are statistically significant for different event windows (up to 20 trading days) following the announcement date. A similar result, using the difference in means between Panels B and C in

announcements of convertible debt offerings, which confirms *Hypothesis 1*. Secondly, the wealth effects are significantly more negative for the more equity-like convertible issues than for the more debt-like issues. This confirms *Hypothesis 2*.

< Insert Figure 1 here >

Figure 1 shows the evolution of the CAARs over the event window (-20, 50) for the total sample as well as for the two sub-samples with a delta measure above or below 0.5. A striking result is that the wealth effect continues to grow negatively after the announcement date. For the total sample, we find a CAAR of -1.35% at the announcement of the issue, while over the event window (-1,2) the CAAR drops to -2.87% and continues to fall to -4.62% over the event window (0,20). From the analysis of the two sub-samples it appears that the more debt-like convertible issues (delta below 0.5) experience negative abnormal returns somewhat prior to the announcement, i.e. -0.77% over the event window (-10,-2), and this rebounds after the announcement of the offering to around 0. Conversely, the more equity-like convertible issues (delta above 0.5) exhibit a significantly positive abnormal return reaction prior to the issue announcement (2.24% in the event window -10,-2), but this becomes significantly negative after the announcement by decreasing to around -4% over the event window (-1,2) and even further to -6.32% over the event window (0,20).

4.2. Inspection of Issue and issuer characteristics

In order to explore the characteristics of the issues and the issuing companies we examine some descriptive statistics for the total sample and the two sub-samples according to the delta measure. Selected descriptive statistics are presented in Table 3.

< Insert Table 3 here >

From Table 3 it appears that the more debt-like convertible issues (Panel B) have significantly lower conversion premiums (ratio between conversion price and stock price at the announcement date of the issue) and shorter maturities than more equity-like convertibles (Panel C), i.e. a conversion premium of 1.153 versus 1.290, and a maturity

Table 2 is obtained using the non-parametric Kruskall-Wallis test for the equality of subpopulations. These results are available on request from the authors.

of 6.4 years versus 9.9 years. A significantly lower conversion premium for the more debt-like convertibles is surprising. Typically, a conversion premium for the more debt-like convertibles should be higher than for the equity-like convertible, since the probability of conversion should be lower. This is correctly reflected in significantly lower maturity and also in the lower volatility (0.21 for more debt-like convertibles versus 0.48 for more equity-like). This can be explained in terms of time varying elements (conversion price, maturity, volatility, dividend yield) that affect the value of delta measure. Most of the debt-like issues in our sample occurred towards the end of our sample period, while the opposite is true for more equity-like issues.

As already shown in the previous section, issuers of the more equity-like convertibles experience significantly positively abnormal returns prior to the announcement of the issue, while those of more debt-like convertibles experience significantly negatively CAAR. The same conclusion can be inferred from Table 3, as the stock price run-up over the period (-10,-2) days prior to the announcement is significantly larger by 3 percentage points for the more equity-like issuers.

Both types of issuers seem to have similar leverage on average (0.236 for the more equity-like versus 0.218 for the more debt-like). The difference between interest coverage capacity is not significant, although the Times-Interest-Earned ratio is on average higher for the more debt-like convertibles by around 0.8.
There is no statistically significant difference between the Q-ratios of the equity-like and the debt-like issues. The equity-like issues do seem to be accompanied by more risk, as indicated by a higher volatility of respectively 48% versus 21% (annually). Note that issuers of equity-like convertibles are characterized as those that might have wanted to issue equity, but due to adverse selection and agency problems this would have been too costly or impossible.

The level of slack is significantly higher for the equity-like convertibles (8.5% of the total assets versus 2.4% of the total assets for debt-like issuers). The dividend payout policy is also significantly different between the issuers of the more equity-like and those of more debt-like convertibles. While 86% of issuers of the more debt-like convertibles pay dividends, only 47% of issuers of the more equity-like convertibles do so. The ratio between capital expenditures and depreciation is on average significantly by twofold higher for more equity-like convertible issuers than more debt-like issuers. The ratio of

2.88 for the more equity-like issuers suggests that they, on average, invest in capital assets almost three times the value of depreciation in a given year. This ratio is below 1 (0.93) for the more debt-like convertible issuers, which means that their capital investments fall short to replace the depreciated assets. This may also be the reason why almost half (11 out of 24) of the more debt-like issuers use the proceeds for mergers and acquisitions – i.e. grow by acquisitions. In case of equity-like convertible issuers, only 7 out of 62 issuers use the proceeds for acquisitions. More equity-like issuers also have, on average, negative free cash flow relative to the total assets (-6.9% of the total assets), while the free cash flow for the more debt-like issuers is, on average, positive (1.6% of the total assets). This implies that, given the costly external finance, more equity-like issuers are more financially constrained than more debt-like convertible bond issuers.

Overall, the more equity-like convertible issuers seem to have slightly better growth opportunities, are riskier, are less likely to pay dividends, invest relatively more, and are more financially constrained than the more debt-like convertible issuers. This is in line with many previous findings (see for example Lewis et al., 1999; Jen et al., 1997) on the characteristics of convertible debt issuers.

4.3. Cross sectional analysis of determinants of the size of the wealth effect

In order to examine the impact on the size of the wealth effect due to the implicit design of convertibles (e.g. delta) and the issuer characteristics associated with debt- and equity-related agency costs, we perform a number of cross sectional regressions. In all the models we consider, the dependent variable is the cumulative average abnormal return in the event window (-1,1).

< Insert Table 4 here >

In the first specification, we test our hypotheses regarding the effects of debt-related agency costs (*Hypotheses 3a and 3b*), equity-related agency costs (*Hypotheses 4a, 4b, 4c*), the effect of tax burden (*Hypothesis 5*) and the mitigating effect of growth opportunities (*Hypothesis 6*) for the total sample of convertible debt issues over the period 1991 - 2004.

Based on the results of the first regression specification in Table 4[9], we do not find support for *Hypotheses 3a and 3b*. The proxy for leverage (LEV) gives the expected positive sign, but it is insignificant. The proxy for Times-Interest-Earned (TIE) gives an unexpected negative sign, but this is also insignificant. *Hypothesis 4a* is confirmed, because we see that the market valuation is worse after a period of significant stock price run-up (a significantly negative coefficient of -0.332). This implies that an increase in cumulative abnormal stock returns in the event window (-10,-2) of 3 percent decreases the announcement related CAAR by 1 percentage point. This confirms the hypothesis that investors are more concerned with overvaluation when the announcement of the issue is preceded by a streak of positive abnormal stock returns. Next, we find that the level of slack significantly positively affects CAAR. The coefficient of 0.167 implies that an increase in slack of 10 percentage points increases the CAAR related to the announcement of the issue by 1.7 percent. As mentioned earlier, this result suggests that slack can be viewed as a build-up of internally generated funds. These are in particular important when the external sources of financing are very costly. Judging by our results, this effect dominates the effect of the high agency costs of slack capital. We expected the market valuation effect to be less favorable when the issuing firm has more free cash flow (*Hypothesis 4b*). However, even though we find the expected negative sign for the coefficient, it is not significant. Therefore, we have to reject this hypothesis. The coefficient for the payout dummy variable is significantly positive 0.035. This implies that companies that pay dividends may expect to have, on average, a positive effect on the CAAR at the announcement of convertible debt offering of around 3.5 percent compared to the non-dividend paying companies, all else being equal. This confirms *Hypothesis 4c* and is in line with the disciplining role of the payout policy. On the other hand, it could also account for the fact that dividend paying companies are usually mature and less risky companies. The more direct effect of the disciplining role of dividend payments needs to be explored on the subset of more equity-like convertible debt issuers, where the agency costs of equity are assumed to be more important. The coefficient for growth opportunities (Q) was hypothesized to be positive, but it is insignificantly negative. Therefore we can not confirm *Hypothesis 6*.

In the second specification in Table 4, we additionally include a tax dummy variable in the cross sectional regression to test for the effect of income taxes on the wealth effect.

[9] Note that the number of observations is less than 86 (initial sample) due to missing accounting items or delta measures for some issues.

While other coefficients remain practically unchanged, we find no significant effect of taxes on the wealth effect associated with the announcement of the convertible debt offering. We therefore find no support for *Hypothesis 5*.

Note that such an analysis for the total sample is not the most appropriate, since the design of the convertible has to be taken into account as we argued in Section 2.2. We therefore also estimate the third specification in Table 4, where we include a control variable for implicit issue characteristics by adding the delta measure as an explanatory variable. The delta measure reflects how debt- or equity-like the convertible issue is, and therefore it captures the issue characteristics comprehensively. Since a value of delta closer to 1 indicates a more equity-like convertible issue, we expect to find a negative relationship between the size of the wealth effect and the value of delta. The results of the third specification in Table 4 are very similar to those in specifications 1 and 2. The effect of delta on CAAR is negative, but it is not significant. The overall results suggest that perceived overvaluation, slack and payout policy significantly affect the size of the wealth effect. This is, however, due to the fact that most of the issues in our sample are more equity- than debt-like. In order to test hypotheses related to impact of debt-related and equity-related costs on the size of wealth effects, we estimate the regressions separately for two sub-samples split according to implicit issue characteristics (delta).

< Insert Table 5 here >

In Panel A of Table 5 we present the estimation results of these two specifications, without dummies for the proceeds, for the two sub-samples split by the cut-off value of 0.5 for the delta measure. Note that convertible issues with a value of delta below 0.5 are denoted as more debt-like, while those with a value of delta above 0.5 as more equity-like. We expect that debt-related costs will have a significant impact for more debt-like convertibles, and equity-related costs will have a significant impact for more equity-like convertibles. As the results of specifications 1 and 2 in Panel A of Table 5 show, the leverage has a positive sign for the convertible with the value of delta below 0.33 and a negative sign for those with the value of delta below 0.5. However, the coefficients are insignificant. This means that, just like in Table 4, we don't find a confirmation for *Hypothesis 3a*. The interest coverage has a significantly positive effect on CAAR in the both cases (columns 1 and 2) of more debt-like convertible bond issues. This can be interpreted as a confirmation of *Hypothesis 3b*. The economic significance of the effect of

interest coverage seems to be rather small, but given the very high variation in the TIE-ratio (between around -2 to around 40 for debt-like convertible issues), the coefficient of around 0.002 suggests that increase in TIE of 5 leads to the increase in CAAR of around 1 percent, all else being equal. In both sub-samples of debt-like convertibles, growth opportunities have a significantly negative effect on CAAR (coefficient of between -0.05 and –0.04), where an increase in the Q-ratio of 0.25 leads to approximately 1 percent decrease in CAAR. This can be interpreted as a rejection of *Hypothesis 6*. Company size also has a significantly negative effect on CAAR. Although the negative effect of growth opportunities seems somewhat surprising, one can also think of the Q-ratio as a proxy for the risk of the company. As stated earlier, firm size might not only mitigate adverse selection and agency problems, but could actually make them more acute since the opaqueness increases with the size. This might lead to difficulties in risk estimation such that larger issuers with higher growth opportunities (in the universe of more debt-like convertible issues) are perceived to be riskier. This negative effect on CAAR is mitigated with better interest ratio coverage and higher slack (positive impact of slack on valuation is marginally significant in regression (1)). As mentioned earlier, one might think of a slack as having a role of collateral. For instance, an increase of slack (coefficient of 0.213) relative to the total assets of 5 percentage points leads to approximately 1 percentage point increase in CAAR. To sum up, we find support for one of the hypotheses relating to the effect of debt-related agency costs on the wealth effects associated with the announcement of convertible debt offerings for the sub-sample of debt-like convertibles, while equity-related agency costs do not adversely affect the valuation in this case. We do not find any significant effect of tax burden on the valuation (*Hypothesis 5*).

The specifications 3 and 4 in Panel A of Table 5 relate to the sub-samples of more equity-like convertible bond issues. Here, we find that proxies relating to the agency cost of equity significantly affect the wealth effects at the announcement of convertible debt issues. More specifically, the prior stock price run-up negatively affects the valuation, as there is more concern about the potential overvaluation of the equity. As in Table 4, this result can be interpreted as a confirmation of *Hypothesis 4a*. The coefficients for SPRUN of -0.32 (delta<0.5) and -0.39 in the case of convertibles with the value of delta being higher than 0.67 suggest that a 5 percent positive cumulative average abnormal return in a ten day period prior to the announcement of the issue leads to negative 1.5 to 2 percent CAAR following the announcement. This is mitigated by the dividend payout

policy (coefficient of 0.34 for PAYDUM), where equity-like convertible debt issuers that pay dividends on average experience 3.3 percent higher CAAR than non-dividend paying companies, in case of convertibles with the value of delta being higher than 0.5. As in Table 4, this is in line with *Hypothesis 4c*. Similarly, in the case of convertible with value of delta higher than 0.67, the effect of payout policy is still positive, but becomes of less importance and insignificant. Here however, the effect of free cash flow becomes negative (coefficient of –0.113) and marginally significant. This suggests that more equity-like convertible issuers are, in addition, even more plagued with agency cost of equity, which gives some support for *Hypothesis 4b*. Again, as in Table 4, we find a significant positive effect of slack (coefficient of between 0.21 and 0.23) on the valuation. As discussed previously, this confirms that the overall effect of slack is positive, or, put differently, the flexibility benefits of such "buffer" funds in the case of costly external financing outweigh the agency cost of slack. For the more debt-like convertible issues in columns 1 and 2, we find a positive (and again not significant) effect of free cash flow. This also leads to a rejection of *Hypothesis 4c*. With respect to the tax dummy, we do not find a significant effect on the valuation in the case of more equity-like convertible issues, again leading to a rejection of *Hypothesis 5*.

In Panel B of Table 5, we redo the sub-sample analysis for more equity-like versus more debt-like convertibles using the alternative measure of equity-to-debt component of convertible bond (ED). The results for the more equity-like convertibles (columns 3 and 4) remain almost the same in terms of statistical and economic significance as in the case of sub-sample analysis based on delta measure in Panel A. The effect of free cash flow on the wealth effect here is marginally negatively significant (a coefficient of -0.129 in column 3), giving some support to *Hypothesis 4b*. This suggests that in the case of equity-like convertibles, an increase in free cash flow to assets ratio of 0.1 leads to a decrease in CAAR of around 1.2 percentage points, all else being equal. The results for the sub-sample of the more debt-like convertibles, as defined with the value of ED below 0.75, are mostly similar to those in columns 1 and 2 of Panel A (more debt-like convertibles as measured with delta measure), giving support to *Hypothesis 3b*. In addition, the coefficient of leverage is significantly negative (-0.14), which gives some support for *Hypothesis 3a*. The effects of stock price run-up and dividend payments are significant or marginally significant, but of the opposite signs as in the case of more equity-like convertibles. We interpret this as additional evidence to support the conjecture that equity-like and debt-like convertible issuers are adversely affected by different types of

agency costs. Summarizing, the sub-sample analysis based on an alternative measure of convertible security design (equity-to-debt component value) gives similar results as the sub-sample analysis based on the delta measure.

De Jong and Veld (2001) argue that the profitability of the projects reduces the potential for asset substitution problems and adverse selection. In order to examine the effect of the stated use of the proceeds of the convertible issue on the wealth effect, we estimate a number of specifications where we include dummy variables for Merger & Acquisitions (M&A), Refinancing, and Capital Expenditure (CAPX) or General Expenditure (GENX)[10]. In Panel C of Table 5 we present the estimation results of the specifications with dummies for the proceeds for the total sample of convertible debt issues over the period 1991 - 2004. First, we do not find a significant effect of the stated use of proceeds on the valuation, as coefficients for all dummy variables relating to the stated use of proceeds are not significant. Secondly, the effect of other issuer characteristics on the wealth effects remains in line with the results from Table 4. We conclude that use of proceeds does not seem to affect the abnormal returns.

Finally, in Panel D of Table 5 we present the estimation results for the two sub-samples, split according to the value of the Q-ratio. We have used values of 0.9, 1 and 1.1 as cut-off points. First, the results show that stock price run-up (overvaluation concern) has a significant negative effect for the sub-sample of companies with better growth opportunities (columns 3 and 4), with coefficients of around -0.25. The dividend payout dummy is only significantly positive for the companies with lower Q (coefficient of 0.04). Interestingly, this positive effect is not significant for companies with values of Q lower than 0.9. However, for these companies the effect of slack becomes more important (coefficient 0.6235) and marginally significant, as opposed to the extended sub-sample of lower Q companies (column 2). This might suggest that for the companies with worse growth opportunities (column 1), the role of slack as collateral becomes more important than just relying on a disciplining role of payout policy (as in the case of lower growth companies with values of Q closer to 1 – column 2). The impact of leverage on the valuation is positive (and marginally significant) in the case of lower Q companies. This is to say that, in the absence of good growth opportunities, dividend payout is not a sufficient controlling device per se. Therefore debt serves the role of this alternative, more powerful, controlling device. This is in line with Jensen's (1986) argument about

[10] If issuers stated more potential uses of proceeds, we recorded the first use stated as predominant.

the relative effectiveness of payout policies versus debt as controlling device. Finally, slack has a positive (and marginally significant) effect on shareholders' wealth in the case of higher Q companies. This goes back to the trade-off between the costs and benefits of slack and is consistent with results in previous tables. In Table 6 we present the summary of hypotheses and the results.

< Insert Table 6 here >

In general, our results suggest that debt- and equity-related costs negatively affect the size of the wealth effects associated with the announcements of convertible debt offerings, in particular if issues are split according to its design characteristics (either more debt- or equity-like). We find no evidence that the use of proceeds affects the valuation. We show that the negative effect of a stock price run-up prior to the announcement, positive effect of slack, and dividend payout are consistent across different specifications and sample splits. We find no evidence for the tax hypothesis relating to the benefits of the use of convertible debt as opposed to the use of equity. Finally, we find that companies with lower growth opportunities benefit from the additional controlling device (leverage), while companies with higher growth opportunities benefit from higher slack, as benefits of such flexible internal funds relative to costly external financing seem to outweigh the agency cost of slack, in particular when certain controlling devices are in place (payout, leverage).

5. CONCLUSION

In this paper we analyze the size and determinants of wealth effects associated with the announcements of convertible debt offerings on the Canadian market in the period between 1991 and 2004.

Similarly to previous research for other markets, in particular the U.S., we find a significant negative wealth effect associated with the announcement date of convertible debt offerings. We also find support for the hypotheses related to the negative impact of debt- and equity-related agency costs on the size of the wealth effect. In particular, we find that the determinants of the size of the wealth effects reflect the hybrid nature of convertible debt, where convertible debt issues can be structured to be either more debt- or equity-like. More specifically, we show that proxies for agency costs of equity

negatively affect abnormal returns associated with the issue of more equity-like convertibles, while they do not significantly affect wealth effects associated with the more debt-like convertible issues. The opposite holds for the agency costs of debt.

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Table 1

Breakdown of convertible debt issues according to year of the issue. Distribution of non-financial Canadian companies that announced a convertible bond loan in the period from January 1991 to December 2004 by announcement year. The announcements are identified from the SDC database. Announcements are eliminated for the following reasons (1) no stock and accounting data available; (2) non-verifiable announcement dates; (3) non-standard convertible bonds; (4) issuance dates overlap or are very close to issuance dates of other securities.

Year	Frequency	Percent
2004	10	17.5
2003	13	17.5
2002	12	14.3
2001	6	11.1
2000	3	4.8
1999	7	9.5
1998	4	3.2
1997	4	6.3
1996	5	1.6
1995	2	3.2
1994	8	11.1
1993	5	7.9
1992	3	3.2
1991	4	4.8
Total	**86**	**100.0**

Table 2

Cumulative Average Abnormal Returns (CAAR) for different event windows

Cumulative average abnormal returns for the sample of 86 convertible bond announcements by Canadian companies from January 1991 to December 2004. The convertible bond announcements are identified from the SDC database. Abnormal returns are based on the market model, estimated over a 100-day period for each company (from day -120 to day -20). Under the null hypothesis CAR equals 0.

* - denotes significance at below 10% level, ** - denotes significance at below 5% level and *** - denotes significance at below 1% level

CAAR window		Panel A - Total Sample n=86		Panel B - delta above 0.5 n=62		Panel C - delta below 0.5 n=24		Panel B - Panel C
		CAAR	J1 stat.	CAAR	J1 stat.	CAAR	J1 stat.	difference
-10	-2	1.426%	3.92***	2.240%	4.62***	-0.769%	-2.42***	3.009%**
-5	-2	0.680%	2.00**	0.990%	2.20**	-0.155%	-0.47	1.145%
-2	0	-0.598%	-1.25	-1.150%	-1.80**	0.890%	2.16**	-2.040%**
-1	0	-0.539%	-1.45*	-0.860%	-1.75**	0.328%	0.93	-1.187%
-1	1	-2.703%	-6.53***	-3.669%	-6.63***	-0.098%	-0.29	-3.571%***
-1	2	-2.874%	-7.48***	-3.995%	-7.80***	0.145%	0.43	-4.140%***
-1	5	-2.871%	-8.60***	-4.000%	-8.99***	0.171%	0.58	-4.171%***
0	0	-1.351%	-3.74***	-1.982%	-4.37***	0.350%	0.67	-2.332%***
0	1	-3.516%	-11.58***	-4.791%	-11.84***	-0.076%	-0.29	-4.715%***
0	2	-3.687%	-12.21***	-5.117%	-12.82***	0.167%	0.56	-5.284%***
0	5	-3.684%	-12.91***	-5.122%	-13.52***	0.193%	0.74	-5.315%***
0	20	-4.623%	-17.17***	-6.324%	-17.75***	-0.038%	-0.14	-6.287%***

Table 3

Descriptive statistics for issue and issuer characteristics for total sample, sub-sample with delta < 0.5 and sub-sample with delta > 0.5

Descriptive statistics for the 86 convertible bond announcements by Canadian companies from January 1991 to December 2004. The convertible bond announcements are identified from the SDC database. The sub-samples are divided according to the delta (below and above 0.5) of the conversion rights. DELTA is a measure of the sensitivity of the value of the convertible bond with respect to the value of the underlying equity. This measure is calculated using the option pricing model of Black and Scholes corrected for continuous dividend payments (see equation 8). LEV is computed as the ratio between total debt and total assets. TIE is the Times-Interest-Earned ratio. This is defined as EBIT (Earnings Before Income and Taxes) over interest expense. SLACK is the ratio of cash and equivalents over total assets. SPRUN is the cumulative average abnormal stock return measured over the window (-10,-2) relative to the announcement date. FCFA is the ratio of free cash flow (net income + depreciation – capital expenditures) over the total assets. PAYDUM is a dummy variable with value 1 if the company paid cash dividends in the previous year and value 0 otherwise. Q is a Tobin's Q-ratio measured as (market value of equity measured as average between (-15,-5) days relative to the announcement date + book value of long and short term debt) over the book value of total assets. TAXDUM is a dummy variable with value 1 if the company paid income taxes in the previous year and value 0 otherwise. LNTA is the natural logarithm of total assets. CAPXDEP is the ratio between capital expenditures and depreciation. CPREM is conversion premium, defined as the ratio between conversion price and the stock price. VOLAT is the annualized stock returns volatility, measured during the period (-120, -20) relative to the announcement date of the issue.

* - denotes significance at below 10% level, ** - denotes significance at below 5% level and *** - denotes significance at below 1% level

Variable	mean	min	max	median	cv	n
Panel A: Total sample						
LEV	0.232	0.000	0.697	0.182	0.776	79
TIE	3.859	-35.920	101.798	1.526	4.663	78
SPRUN	0.015	-0.548	0.311	0.008	7.273	86
SLACK	0.069	0.000	0.390	0.042	1.157	81
FCFA	-0.046	-0.540	0.149	0.001	-2.860	78
PAYDUM	0.570	0.000	1.000	1.000	0.875	79
Q	1.364	0.250	6.454	1.069	0.835	80
LNTA	13.639	10.583	17.957	13.580	0.109	81
CAPXDEP	2.385	0.000	19.809	1.277	1.620	79
MATURITY	8.908	0.162	30.041	7.005	0.680	86
CPREM	1.193	0.316	3.134	1.137	0.293	86
VOLAT	0.406	0.119	1.466	0.321	0.607	86
DELTA	0.608	0.008	0.991	0.701	0.508	86

Table 3 – continued

Variable	mean	min	max	median	cv	n
Panel B: Delta < 0.5						
LEV	0.218	0.000	0.490	0.199	0.610	21
TIE	4.452	-2.223	41.621	2.004	2.244	20
SPRUN	-0.008	-0.104	0.116	-0.005	-8.184	24
SLACK	0.024	0.000	0.165	0.000	1.790	21
FCFA	0.016	-0.143	0.121	0.023	3.993	21
PAYDUM	0.857	0.000	1.000	1.000	0.418	21
Q	1.304	0.506	3.049	1.168	0.405	21
LNTA	13.240	11.435	15.475	13.333	0.067	21
CAPXDEP	0.931	0.002	2.878	0.902	0.933	20
MATURITY	6.355	0.162	20.989	5.416	0.613	24
CPREM	1.153	1.004	2.509	1.086	0.287	24
VOLAT	0.205	0.119	0.350	0.192	0.290	24
DELTA	0.159	0.008	0.495	0.143	0.818	24
Panel C: Delta > 0.5						
LEV	0.236	0.000	0.697	0.178	0.823	58
TIE	3.654	-35.920	101.798	1.173	5.500	58
SPRUN	0.022	-0.548	0.311	0.022	5.388	62
SLACK	0.085	0.000	0.390	0.066	0.989	60
FCFA	-0.069	-0.540	0.149	-0.017	-2.071	57
PAYDUM	0.466	0.000	1.000	0.000	1.081	58
Q	1.385	0.250	6.454	0.992	0.933	59
LNTA	13.779	10.583	17.957	13.803	0.118	60
CAPXDEP	2.878	0.000	19.809	1.484	1.509	59
MATURITY	9.896	2.003	30.041	7.134	0.653	62
CPREM	1.290	1.038	3.134	1.204	0.247	62
VOLAT	0.484	0.188	1.466	0.418	0.512	62
DELTA	0.782	0.509	0.991	0.811	0.165	62
Panel D: Difference in means Panel C - Panel B						
LEV	0.018					
TIE	-0.798					
SPRUN	0.030 **					
SLACK	0.061 ***					
FCFA	-0.085 ***					
PAYDUM	-0.392 ***					
Q	0.081					
LNTA	0.538 **					
CAPXDEP	1.947 ***					
MATURITY	3.541 ***					
CPREM	0.137 **					
VOLAT	0.279 ***					
DELTA	0.622 ***					

Table 4

OLS regressions of the cumulative average abnormal returns in the event window (-1,-1) on the issue and issuer characteristics

Dependent variable is cumulative average abnormal return in the event window (-1,-1) around the convertible debt offering announcement. Cumulative average abnormal returns are for the sample of 86 convertible bond announcements by Canadian companies from January 1991 to December 2004. The convertible bond announcements are identified from the SDC database. Abnormal returns are based on the market model, estimated over a 100-day period for each company (from day -120 to day -20). LEV is computed as the ratio between total debt and total assets. TIE is the Times-Interest-Earned ratio. This is defined as EBIT (Earnings Before Income and Taxes) over interest expense. SLACK is the ratio of cash and equivalents over total assets. SPRUN is the cumulative average abnormal stock return measured over the window (-10,-2) relative to the announcement date. FCFA is the ratio of free cash flow (net income + depreciation – capital expenditures) over the total assets. PAYDUM is a dummy variable with value 1 if the company paid cash dividends in the previous year and value 0 otherwise. Q is a Tobin's Q-ratio measured as (market value of equity measured as average between (-15,-5) days relative to the announcement date + book value of long and short term debt) over the book value of total assets. TAXDUM is a dummy variable with value 1 if the company paid income taxes in the previous year and value 0 otherwise. LNTA is the natural logarithm of total assets. DELTA is the measure of the sensitivity of the value of convertible bond with respect to the value of the underlying equity. This measure is calculated using the option pricing model of Black and Scholes corrected for continuous dividend payments (see Equation 8). All the standard errors are White heteroskedasticity corrected.

* - denotes significance at below 10% level

** - denotes significance at below 5% level

*** - denotes significance at below 1% level

Variable	1		2		3	
	Coef.	**t**	**Coef.**	**t**	**Coef.**	**t**
LEV	0.0093	0.32	0.0115	0.37	0.0100	0.32
TIE	-0.0001	-0.51	0.0000	-0.06	-0.0001	-0.42
SLACK	0.1666	2.18**	0.1723	2.23**	0.1678	2.11**
SPRUN	-0.3322	-2.47**	-0.3263	-2.40**	-0.3386	-2.36**
FCFA	-0.0525	-1.21	-0.0466	-1.02	-0.0636	-1.28
PAYDUM	0.0351	3.19***	0.0336	3.10***	0.0281	2.07**
Q	-0.0047	-0.82	-0.0043	-0.78	-0.0046	-0.77
LNTA	-0.0077	-1.90*	-0.0069	-1.62	-0.0063	-1.13
TAXDUM			-0.0076	-0.55	-0.0010	-0.06
DELTA					-0.0215	-0.81
_CONS	0.0551	0.93	0.0472	0.77	0.0530	0.74
N	80		80		74	
Adj. R^2	0.329		0.322		0.310	

Table 5

OLS regressions of abnormal returns at the announcement date of convertible debt offering on issue and issuer characteristics for split samples

Dependent variable is cumulative average abnormal return in the event window (-1,-1) around the convertible debt offering announcement. Cumulative average abnormal returns are for the sample of 86 convertible bond announcements by Canadian companies from January 1991 to December 2004. The convertible bond announcements are identified from the SDC database. Abnormal returns are based on the market model, estimated over a 100-day period for each company (from day -120 to day -20). LEV is computed as the ratio between total debt and total assets. TIE is the Times-Interest-Earned ratio. This is defined as EBIT (Earnings Before Income and Taxes) over interest expense. SLACK is the ratio of cash and equivalents over total assets. SPRUN is the cumulative average abnormal stock return measured over the window (-10,-2) relative to the announcement date. FCFA is the ratio of free cash flow (net income + depreciation – capital expenditures) over the total assets. PAYDUM is a dummy variable with value 1 if the company paid cash dividends in the previous year and value 0 otherwise. Q is a Tobin's Q-ratio measured as (market value of equity measured as average between (-15,-5) days relative to the announcement date + book value of long and short term debt) over the book value of total assets. TAXDUM is a dummy variable with value 1 if the company paid income taxes in the previous year and value 0 otherwise. LNTA is the natural logarithm of total assets. DELTA is the measure of the sensitivity of the value of convertible bond with respect to the value of the underlying equity. This measure is calculated using the option pricing model of Black and Scholes corrected for continuous dividend payments (see Equation 8). M&ADUM is a dummy variable with value 1 if issuer stated to use the proceeds for acquisitions and 0 otherwise. REFDUM is a dummy variable with value 1 if issuer stated to use the proceeds for refinancing and 0 otherwise. CGXDUM is a dummy variable with value 1 if issuer stated to use the proceeds for capital and general expenditure and 0 otherwise. All the standard errors are White heteroskedasticity corrected.

* - denotes significance at below 10% level, ** - denotes significance at below 5% level, *** - denotes significance at below 1% level

Panel A: Delta

Variable	1		2		3		4	
	Delta < 0.33		Delta < 0.5		Delta > 0.5		Delta > 0.67	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
LEV	0.0230	0.31	-0.0261	-0.36	0.0184	0.52	0.0186	0.46
TIE	0.0023	2.78**	0.0017	2.16**	-0.0001	-0.34	-0.0004	-1.10
SLACK	0.2132	2.23**	0.1831	1.63	0.2320	2.59**	0.2140	2.31**
SPRUN	0.0193	0.13	0.0069	0.05	-0.3165	-2.02**	-0.3945	-2.58**
FCFA	0.0852	0.84	0.1441	1.25	-0.0875	-1.40	-0.1128	-1.86*
PAYDUM	0.0015	0.07	-0.0053	-0.23	0.0339	2.43**	0.0255	1.42
Q	-0.0499	-2.48**	-0.0418	-2.03*	-0.0051	-0.96	-0.0047	-0.72
LNTA	-0.0504	-4.71***	-0.0398	-4.05***	-0.0036	-0.73	-0.0067	-1.13
TAXDUM	-0.0223	-1.16	-0.0082	-0.46	0.0024	0.13	0.0173	0.97
_CONS	0.7159	4.76***	0.5816	4.17***	-0.0177	-0.23	0.0195	0.22
N	19		20		60		48	
Adj. R^2	0.548		0.557		0.307		0.442	

Table 5 - continued

Panel B: Equity-to-Debt component

Variable	1		2		3		4	
	ED<0.75		ED<1		ED>1		ED>2	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
LEV	-0.1407	-2.26**	-0.0352	-0.65	0.0385	0.99	0.0621	1.14
TIE	0.0023	3.08**	0.0007	0.84	-0.0001	-0.25	0.0001	0.25
SLACK	0.3581	0.62	0.1371	2.05*	0.2799	2.90***	0.2800	2.82***
SPRUN	0.2797	2.35**	-0.1489	-0.95	-0.3633	-2.33**	-0.3965	-3.23***
FCFA	0.2321	0.88	0.0487	0.54	-0.1291	-1.78*	0.0496	0.51
PAYDUM	-0.0233	-0.54*	0.0319	1.43	0.0328	2.43**	0.0452	2.79***
Q	-0.0154	-0.41	0.0058	0.35	-0.0039	-0.70	-0.0084	-1.61
LNTA	-0.0187	-1.46	-0.0050	-0.55	-0.0055	-1.01	-0.0030	-0.56
TAXDUM	-0.0490	-2.03*	-0.0100	-0.61	0.0071	0.32	-0.0350	-1.82*
_CONS	0.3164	1.52	0.0305	0.26	-0.0048	-0.06	-0.0094	-0.13
N	18		27		54		34	
Adj. R^2	0.439		0.301		0.352		0.649	

Table 5 - continued

Panel C: Use of proceeds

Variable	1		2		3	
	M&A		Refinancing		Capital and General exp.	
	Coef.	**t**	**Coef.**	**t**	**Coef.**	**t**
LEV	0.0102	0.38	0.0080	0.31	0.0084	0.31
TIE	-0.0001	-0.46	0.0000	-0.08	0.0000	-0.15
SLACK	0.1728	2.22**	0.1719	2.18**	0.1769	2.33**
SPRUN	-0.3324	-2.59**	-0.3291	-2.63***	-0.3236	-2.49**
FCFA	-0.0369	-0.78	-0.0450	-0.95	-0.0485	-1.05
PAYDUM	0.0287	2.16**	0.0334	2.96***	0.0324	2.69***
Q	-0.0042	-0.79	-0.0043	-0.80	-0.0041	-0.74
LNTA	-0.0058	-1.25	-0.0070	-1.51	-0.0066	-1.50
TAXDUM	-0.0084	-0.60	-0.0077	-0.55	-0.0081	-0.57
M&ADUM	0.0148	1.05				
REFDUM			0.0004	0.03		
CGXDUM					-0.0065	-0.42
_CONS	0.0330	0.51	0.0488	0.80	0.0458	0.76
N	81		81		81	
Adj. R^2	0.339		0.332		0.334	

Table 5 - continued

Panel D: Growth opportunities

Variable	1		2		3		4	
	Q<0.9		Q<1		Q>1		Q>1.1	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
LEV	0.1629	1.97*	0.1214	1.71*	-0.0379	-1.50	-0.0292	-1.10
TIE	0.0004	0.25	0.0001	0.05	-0.0001	-0.52	-0.0001	-0.50
SLACK	0.6235	1.74*	0.4672	1.55	0.0982	1.81*	0.0932	1.62
SPRUN	-0.2533	-1.29	-0.2717	-1.42	-0.2474	-3.14***	-0.2604	-3.02***
FCFA	0.2162	1.14	0.1780	1.25	-0.0514	-1.10	-0.0427	-0.91
PAYDUM	0.0294	1.09	0.0400	2.08**	0.0233	1.34	0.0186	0.92
LNTA	0.0044	0.40	-0.0001	-0.01	-0.0047	-0.70	-0.0074	-1.07
TAXDUM	-0.0255	-0.83	-0.0214	-0.86	-0.0104	-0.63	-0.0026	-0.14
_CONS	-0.1656	-0.95	-0.0891	-0.61	0.0344	0.42	0.0653	0.77
N	29		34		47		40	
Adj. R^2	0.312		0.328		0.234		0.207	

Table 6

Overview of hypotheses and the results of the tests of the hypotheses

This table gives an overview of the hypotheses that we test in this paper as well as of the results of these tests. The delta-specific and ED-specific sub-sample results are from columns (1) and (2) of Panels A and B in Table 5 for hypotheses 3a and 3b, from columns (3) and (4) for hypotheses 4a to 4c, and from columns (1) to (4) for hypotheses (5) and (6).

Hypothesis	Proxy	Table with result	Result	Result (delta-specific sub-sample)	Result (ED-specific sub-sample)
H1: The announcement of convertible bond offerings by companies in Canada has a significant negative market valuation effect	Cumulative Average Abnormal Return (CAAR)	Table 2	Confirmed		
H2: The market valuation effect will be more negative for equity-like convertibles than for debt-like convertibles	Difference in CAARs between equity-like (delta>0.5) and debt-like (delta<0.5) convertibles	Table 2	Confirmed		
Agency costs of debt					
H3a: Higher financial leverage negatively affects the market valuation, in particular for more debt-like convertibles	Leverage (LEV): ratio between total debt and total assets	Tables 4 and 5	Rejected	Rejected	Confirmed
H3b: Interest coverage positively affects the market valuation	Times-interest-earned ratio (TIE): Earnings Before Income and Taxes over interest expense on debt	Tables 4 and 5	Rejected	Confirmed	Confirmed

Table 6 - continued

Hypothesis	Proxy	Table with result	Result	Result (delta-specific sub-sample)	Result (ED-specific sub-sample)
Agency costs of equity					
H4a: A period of positive abnormal returns preceeding the announcement date negatively affects the market valuation	CAAR over the window (-10,-2) relative to the announcement date	Tables 4 and 5	Confirmed	Confirmed	Confirmed
H4b: A higher free cash flow negatively affects the market valuation	Free cash flow (FCFA): ratio of free cash flow (net income + depreciation – capital expenditures) over total assets	Tables 4 and 5	Rejected	Confirmed	Inconclusive
H4c: Dividends payments positively affect the market valuation	PAYDUM: a dummy variable with value 1 if the company paid cash dividends and value 0 otherwise	Tables 4 and 5	Confirmed	Confirmed	Confirmed
Tax hypothesis					
H5: Income taxes positively affect the market valuation, in particular for more equity-like convertibles	TAXDUM: a dummy variable with value 1 if the company paid income taxes and value 0 otherwise	Tables 4 and 5	Rejected	Rejected	Rejected
Agency costs of debt and equity					
H6: Better growth opportunities of the firm positively affect the market valuation	Growth opportunities are measured using Tobin's Q (Q): (market value of equity + short term debt + long term debt) over total assets	Tables 4 and 5	Rejected	Rejected	Rejected

Figure 1

Cumulative Average Abnormal Returns for the total and two sub-samples over the event window (-20, 20)